

What is claimed is:

1           1.     A liquid-crystal display device comprising:  
2           a plurality of address wiring formed on an insulating  
3 substrate;  
4           a gate insulating film formed on said address wiring;  
5           a plurality of data wiring formed in a manner that said  
6 data wiring and said address wiring cross each other;  
7           an upper layer insulating film grown on said data wiring;  
8           a transparent electrode, composed of a transparent  
9 conductive film, formed on said upper layer insulating film and  
10 placed in each of picture element areas surrounded by said  
11 address wiring and said data wiring;  
12           a thin-film transistor section, disposed in each of  
13 picture element areas, used to selectively connect said data  
14 wiring with said transparent electrode by a gate connected to  
15 said address wiring; and  
16           a capacitor section, disposed in each of picture element  
17 areas, composed of a first electrode formed on said gate  
18 insulating film using the same conductive film as used for said  
19 data wiring, a second electrode formed on said upper layer  
20 insulating film using the same transparent conductive film as  
21 used for said transparent electrode and said upper layer  
22 insulating film.

1           2.     The liquid-crystal display device according to  
2 claim 1, wherein said second electrode is formed with an  
3 extended part of said transparent electrode.

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1           3.     The liquid-crystal display device according to  
2 claim 1, wherein said first electrode is connected to said  
3 address wiring using the same transparent conductive film as  
4 used for said transparent electrode.

1           4.     The liquid-crystal display device according to  
2 claim 1, wherein said first electrode is connected to said  
3 address wiring using the same conductive film as used for said  
4 data wiring.

1           5.     The liquid-crystal display device according to  
2 claim 1, wherein a part of said capacitor section is formed in  
3 a manner that it is superimposed through said gate insulating  
4 film on said address wiring.

1           6.     The liquid-crystal display device according to  
2 claim 1, wherein a width of said address wiring is constant in  
3 said picture element area and wherein said capacitor section  
4 is formed in a manner that the whole of it is superimposed through  
5 said gate insulating film on said address wiring.

1           7.     The liquid-crystal display device according to  
2 claim 1, wherein the whole of said thin-film transistor section  
3 and of data wiring is covered with said upper layer insulating  
4 film or said transparent conductive film.

1           8.     The liquid-crystal display device according to  
2 claim 1, wherein said upper layer insulating film is thinner  
3 than that of said gate insulating film or a dielectric constant

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4 of said upper layer insulating film is larger than that of said  
5 gate insulating film.

1 9. The liquid-crystal display device according to  
2 claim 1, wherein said upper layer insulating film is a complex  
3 film composed of a plurality of insulating films.

1 10. The liquid-crystal display device according to  
2 claim 1, wherein said upper layer insulating film is composed  
3 of, at least, one kind of a silicon nitride film, silicon oxide  
4 film and metal oxide film.

1 11. The liquid-crystal display device according to  
2 claim 1, wherein said auxiliary capacitive common wiring is  
3 formed in parallel to said address wiring and wherein said  
4 capacitor section is formed in a manner that it is partially  
5 or totally superimposed on said auxiliary capacitive common  
6 wiring.

1 12. The liquid-crystal display device according to  
2 claim 11, wherein connections are made at, at least, two points  
3 between said first electrode and said address wiring or between  
4 said first electrode and said auxiliary capacitive common  
5 wiring.

1 13. The liquid-crystal display device according to  
2 claim 1, wherein said capacitor section is formed by connecting,  
3 in parallel, a first capacitive component composed of a part  
4 of said address wiring, said first electrode and said gate

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5 insulating film put between said address wiring and said first  
6 electrode with a second capacitive component composed of said  
7 first electrode, said second electrode and said upper layer  
8 insulating film put between said first electrode and said second  
9 electrode.

1 14. A method for producing the liquid-crystal display  
2 device of claim 1, comprising the steps of:

3 forming a plurality of address wiring on an insulating  
4 substrate;

5 forming a gate insulating film on said address wiring;

6 forming a plurality of data wiring on said gate insulating  
7 film in a manner that said data wiring and address wiring cross  
8 each other;

9 forming a thin-film transistor used to selectively  
10 connect said data wiring with said transparent electrode  
11 disposed in each of picture element areas by a gate connected  
12 to said address wiring, in each of picture element areas  
13 surrounded by said address wiring and data wiring;

14 forming a first electrode using the same conductive film  
15 as used for said data wiring;

16 forming an upper layer insulating film on said first  
17 electrode;

18 forming a second electrode using the same transparent  
19 conductive film as used for said transparent electrode; and

20 forming said capacitor section using said first electrode,  
21 said second electrode and said upper layer insulating film.

1 15. The method for producing the liquid-crystal

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2 display device according to claim 14, wherein said second  
3 electrode is formed with an extended part of said transparent  
4 electrode in said capacitor section.

1 16. The method for producing the liquid-crystal  
2 display device according to claim 14, wherein said first  
3 electrode is connected to said address wiring using the same  
4 transparent conductive film as used for said transparent  
5 electrode.

1 17. The method for producing the liquid-crystal  
2 display device according to claim 14, wherein said first  
3 electrode is connected to said address wiring using the same  
4 conductive film used for said data wiring.

1 18. A method for producing the liquid-crystal display  
2 device of claim 11, comprising the steps of:

3 forming a plurality of address wiring on an insulating  
4 substrate;

5 forming a plurality of auxiliary capacitive common wiring  
6 in a manner that it is disposed in parallel to said address  
7 wiring;

8 forming a gate insulating film on said auxiliary  
9 capacitive common wiring;

10 forming a plurality of data wiring on said gate insulating  
11 film in a manner that said address wiring and data wiring cross  
12 each other;

13 forming a thin-film transistor used to selectively  
14 connect said data wiring with said transparent electrode

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15 disposed in each of picture element areas by a gate connected  
 16 to said address wiring, in each of picture element areas  
 17 surrounded by said address wiring and data wiring;

18 forming said first electrode using the same conductive  
 19 film as used for said data wiring;

20 forming said upper insulating film on said first  
 21 electrode;

22 forming said second electrode using the same transparent  
 23 conductive film as used for said transparent electrode; and

24 forming said capacitor section using said first electrode,  
 25 said second electrode and said upper layer insulating film in  
 26 a manner that said capacitor is partially or totally  
 27 superimposed on said auxiliary capacitive common wiring.

Sub A' → 19. The method for producing the liquid-crystal  
 2 display device of claim 13 according to claim 14, wherein said  
 3 first electrode is connected to said transparent electrode and  
 4 said second electrode is connected to said address wiring and  
 5 wherein said capacitor section is mounted in a manner that it  
 6 is superimposed on a part of said address wiring.

1 20. A method for producing the liquid-crystal display  
 2 device of claim 4, comprising the steps of:

3 forming a plurality of address wiring on an insulating  
 4 substrate;

5 forming a gate insulating film on said address wiring;

6 forming, in said gate insulating film, a through hole  
 7 which reaches said address wiring;

8 forming a plurality of data wiring on said gate insulating

9 film in a manner that said address wiring and data wiring cross  
10 each other;

11 forming a thin-film transistor used to selectively  
12 connect said data wiring with said transparent electrode  
13 disposed in each of picture element areas by a gate connected  
14 to said address wiring, in each of picture element areas  
15 surrounded by said address wiring and data wiring;

16 forming said first electrode using the same conductive  
17 film used for said data wiring;

18 connecting said first electrode to said address wiring  
19 via said through hole formed in said gate insulating film;

20 forming said upper layer insulating film on said first  
21 electrode;

22 forming said second electrode using the same transparent  
23 conductive film as used for said transparent electrode; and

24 forming said capacitor section using said first electrode,  
25 said second electrode and said upper layer insulating film.

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